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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,621	05/26/2005	Masahiko Nakamori	UNU40.005APC	9275
20995 7590 06/25/2009 KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614				
EXAMINER MACARTHUR, SYLVIA				
ART UNIT		PAPER NUMBER		
1792				
NOTIFICATION DATE		DELIVERY MODE		
06/25/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jcartee@kmob.com  
eOAPilot@kmob.com

### Office Action Summary

**Application No.**

10/536,621

**Applicant(s)**

NAKAMORI ET AL.

**Examiner**

Sylvia R. MacArthur

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 3/20/2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4, 7 and 10-22 is/are pending in the application.
- 4a) Of the above claim(s) 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7 and 10-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/003)
- Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

1. Before rebutting applicant's remarks over the prior art, the examiner notes that there are at least two interpretations regarding the length (D).
2. Interpretation a) As recited (D) refers to the polishing pad, but when (D) is interpreted as a dimension of the polishing pad as a whole then it follows that the polishing pad is smaller than the material to be polished on the wafer.
3. Interpretation b) The specification recites on page 11 lines 11-13 that (D) is referring to the light transmitting region. If applicant intends that the (D) refer to the light transmitting region it is recommended that the claim recite "...and a length (D) of the light transmitting region in a diametrical direction" in claims 1, 12, and 20.
4. It is further noted that the claim was amended on 9/29/2008 to recite an apparatus for chemical mechanical polishing of material to be polished comprising said material and a polishing pad. Note that the underlined portion of the claim is interpreted as intended use and that the prior art need only be capable of performing CMP on such a material. Hence the claim only requires "an apparatus". Furthermore, the invention is an apparatus and not a method wherein the inclusion of the material or an article worked upon by a structure being claimed, does not impart patentability to the claims. See *In re Young*, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935).
5. Applicant argues that the prior art of Shimomura et al (US 2005/0064709) fails to teach a light transmitting region as claimed. Upon review of the prior art and the claim, the examiner has withdrawn Shimomura et al.

6. The explanation of interpretation a) is the basis of the examiner's maintaining the claim rejections based upon 35 USC 103.
7. It was noted that the rejection of Takashi et al (JP 11-07517) in view of Halley (US 6,361,647) inadvertently omitted claims 18, 19, and 21 in the rejection statement, but was recited in the body of the rejection.
8. New rejections based upon the prior art of Ihsikawa et al (US 2002/0042243) as introduced by applicant in the IDS of 2/3/2009 will be presented below.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-4, 7, 10, 12, 13, 15, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Ihsikawa et al (US 2002/0042243).
11. Regarding claims 1-4, 12, and 20: Ihsikawa et al teaches a CMP apparatus wherein the polishing pad includes a transparent window plate 31 (light transmitting region) and a processing region see abstract and figures. Figure 2 illustrates that the transmitting region is less than the wafer 17. Recall that the actual comparison of (D) to the wafer material depends upon the size of the substrate which is not part of the apparatus and is interpreted as a matter of an intended use. Figure 12 recited that the wavelength ranges from 400 to 800 nm. Note that the pad of Ihsikawa et al anticipates i) and iii). Regarding claim 4: Section [0053] recites that the transmissivity is 22% or greater. See Fig. 16 wherein the differences among light transmittance is 5% or less.

Regarding claim 7: The shape is rectangular, see the Figures. Regarding claim 10: See [0020] polyurethane resin is the material of construction of the pad. Regarding claim 13: See Figures. Regarding claim 15: See [0091], [0185], and [0230].

***Claim Rejections - 35 USC § 103***

**12.** The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1, 7, 10, 13, 15, 18, 19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takashi et al (JP 11-07517) in view of Halley (US 6,361,647).

See the English abstract and the Figure on the English Abstract of Takashi et al teaches a polishing pad with a polishing region and a light transmission region where the light transmission region is illustrated as being rectangular. The figure illustrates that the polishing pad comprises characteristic iii) and that the polishing side comprises groove. Takahashi et al fails to recite that the polishing pad according to claims 1, wherein a scatter of the thickness of the light-transmitting region is 100  $\mu\text{m}$  or less. The examiner interprets that this claimed range also includes the case of no or zero scatter, suggesting the need to minimize the scatter, as motivated by the desire for more accurate detection and process control. Furthermore, the scatter of the thickness depends upon such process parameters as the material of construction and the shape of the transmitting region. Regarding the shape of the transmitting region, see Fig. 7, 8, and 10. Applicant fails to provide a showing of the criticality of the actual percentages, these values

can be optimized based upon such factors as the material of construction of the transmittance region and are known to effect the clarity of measurement and the overall endpoint measurement result, see *In re Aller*, 220 F. 2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to optimize the transmittance in the light transmitting region in order to optimize the measurement result in the recited wavelength ranges for use in CMP.

Takashi fails to specifically teach the length (D) is  $\frac{1}{4}$  to  $\frac{1}{2}$  of the diameter of the wafer.(based on interpretations a) or b)). Nevertheless recall, that the inclusion of material or an article worked upon by a structure being claimed does not impart patentability to the claims. See *In re Young*, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935). Furthermore, the prior art of Halley (US 6,361,647) illustrates in Fig. 1A that it is conventional to have a pad with a smaller diameter than the wafer, see also col. 5 lines 29-39 wherein it is stated that the pad 140 radius is less than the radius of the wafer 10, typically around 20%.According to Halley the motivation to modify the conventional pad to be smaller than the substrate it treats is that it improves the degree of global uniformity. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the conventional pad to be smaller than the substrate it treats is that it improves the degree of global uniformity. Regarding claim 10: Takahashi fails to teach the materials for forming the polishing region and light transmitting region are polyurethane resin. Nevertheless, polyurethane resin is a known material and used for its compliance, see col. 5 lines 17-38 of Halley et al. The motivation to use polyurethane resin as the material of construction for the pad of Takashi is that the material is known as a durable material for the harsh CMP environment. Thus, it would have been obvious for one of ordinary skill in the art at the time of

the claimed invention to provide polyurethane as the material of construction for the polishing pad.

Regarding claim 13: Takashi fails to teach that the pad does not have an uneven structure. See the figures. The motivation to modify the pad of Takashi is that allows for more uniform treatment of the substrate.

Regarding claims 18, 19, and 21: The hardness, compressibility and storage elastic modulus of the fine cell foam is an inherent property of the material chosen for the pad and is thus obvious as material of construction is the determining factor of the physical properties of the pad.

13. Claims 1-4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa Toru (JP 2002-324770) in view of Halley (US 6,361,647)..

See the English abstract and the Figure on the English Abstract of Toru teaches a polishing pad with a polishing region and a light transmission region where the light transmission region is illustrated as being rectangular. The figure illustrates that the polishing pad comprises characteristic iii) and that the transmitting section also comprises light transmittance in the wavelength range of 400-800 nm. Toru fails to recite that the polishing pad according to claims 1, wherein a scatter of the thickness of the light-transmitting region is 100  $\mu\text{m}$  or less. The examiner interprets that this claimed range also includes the case of no or zero scatter, suggesting the need to minimize the scatter, as motivated by the desire for more accurate detection and process control. Furthermore, the scatter of the thickness depends upon such process parameters as the material of construction and the shape of the transmitting region. Absent a showing of persuasive evidence that the particular shape is significant, the examiner opines that the shape of

the transmitting region is a matter of design choice and well within knowledge and skill of one of ordinary skill in the art at the time of the claimed invention to optimize, see also *In re Dailey*, 357 F. 2D 669, 149 USPQ 47 (CCPA 1966). Applicant fails to provide a showing of the criticality of the actual percentages, these values can be optimized based upon such factors as the material of construction of the transmittance region and are known to effect the clarity of measurement and the overall endpoint measurement result, see *In re Aller*, 220 F. 2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to optimize the transmittance in the light transmitting region in order to optimize the measurement result in the recited wavelength ranges for use in CMP.

Toru fails to teach the length (D) of the transmitting region (see element 11, Figures 5 and 7) is  $\frac{1}{4}$  to  $\frac{1}{2}$  of the diameter of the wafer, the examiner interprets this limitation as a matter of an intended use as the pad is claimed relative to the substrate which is not part of the apparatus. Recall, that the inclusion of material or an article worked upon by a structure being claimed does not impart patentability to the claims. See *In re Young*, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935). Furthermore, the prior art of Halley (US 6,361,647) illustrates in Fig. 1A that it is conventional to have a pad with a smaller diameter than the wafer, see also col. 5 lines 29-39 wherein it is stated that the pad 140 radius is less than the radius of the wafer 10, typically around 20%. According to Halley the motivation to modify the conventional pad to be smaller than the substrate it treats is that it improves the degree of global uniformity. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify



the conventional pad to be smaller than the substrate it treats is that it improves the degree of global uniformity.

Regarding claims 2-4: The teachings of Toru and Halley were discussed above. The modification does not specifically state 50% or more/less of 80% or more/less, 90% or more, or 5% or less. However, since the claims are directed to a difference in transmittance, the initial and final values can be determined without undue experimentation. Applicant fails to provide a showing of the criticality of the actual percentages, these values can be optimized based upon such factors as the material of construction of the transmittance region and are known to effect the clarity of measurement and the overall endpoint measurement result, see *In re Aller*, 220 F. 2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to optimize the transmittance in the light transmitting region in order to optimize the measurement result in the recited wavelength ranges for use in CMP.

14. Claims 14, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toru in view of Halley, as applied above, and in further view of Kouchiyu et al (JP 2001261874). The teachings of Toru as modified by Halley were discussed above.

Toru as modified by Halley fails to teach:

Regarding claim 14. The polishing pad according to claims 1, wherein a material for forming the polishing region is fine-cell foam.

Claim 16.: The polishing pad according to claim 14, wherein an average cell diameter of the fine-cell foam is 70  $\mu\text{m}$  or less.

Claim 17: The polishing pad according to claims 1, wherein a specific gravity of the fine-cell foam is 0.5 to 1.0 g/cm.<sup>sup.3</sup>.

The prior art of Kouchiyu et al teaches a thermoplastic elastomer made fine porous foamed body with the following physical properties that are advantageous for using in the design of polishing pad as they provide for an optimal pad capable of polishing a substrate while providing in-situ monitoring of the polishing process. See the English Abstract. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to use the material of Kouchiyu et al to construct the polishing pad. Note of Kouchiyu et al teaches a density of 0.2 to 1 g/cubic centimeter and an average cell diameter of 1 - 30  $\mu\text{m}$ .

15. Claims 2-4, 12, and 20 are rejected under 35 U.S.C. 103(a) as being obvious over Takahashi (JP 11-07517) or Hasegawa Toru (JP 2002-324770) in view of Halley.

Regarding the compression recovery and the thickness of the transmitting region these are optimizable process parameters that can be determined without undue experimentation. These parameters are further a matter of design choice, such as size, shape and the material of construction and the wavelengths. Without a showing of critical of these parameters they are deemed obvious and well within the skill of one familiar with the construction of polishing pad as one of ordinary skill. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the apparatus of Takahashi (JP 11-07517) or Hasegawa Toru (JP 2002-324770) to construct a more optimal polishing pad by optimizing the parameters stated above.

16. Claims 14, 16-19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ihsikawa et al in view of Kouchiyu et al (JP 2001261874).

The teachings of Ihsikawa et al were discussed above.

Ihsikawa et al fails to teach:

Regarding claim 14. The polishing pad according to claims 1, wherein a material for forming the polishing region is fine-cell foam.

Claim 16.: The polishing pad according to claim 14, wherein an average cell diameter of the fine-cell foam is 70  $\mu\text{m}$  or less.

Claim 17: The polishing pad according to claims 1, wherein a specific gravity of the fine-cell foam is 0.5 to 1.0 g/cm.<sup>sup.3</sup>.

The prior art of Kouchiyu et al teaches a thermoplastic elastomer made fine porous foamed body with the following physical properties that are advantageous for using in the design of polishing pad as they provide for an optimal pad capable of polishing a substrate while providing in-situ monitoring of the polishing process. See the English Abstract. Note of Kouchiyu et al teaches a density of 0.2 to 1 g/cubic centimeter and an average cell diameter of 1 - 30  $\mu\text{m}$ . Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to use the material of Kouchiyu et al to construct the polishing pad of Ihsikawa et al.

Regarding claims 18, 19, and 21: The hardness , compressibility and storage elastic modulus of the fine cell foam is an inherent property of the material chosen for the pad and is thus obvious as material of construction is the determining factor of the physical properties of the pad.

17. Claim 11 is rejected under 35 U.S.C. 103(a) as being obvious over Ihsikawa et al in view of Roberts et al (US 6,171,181).

The teachings of Ihsikawa et al were discussed above.

Ihsikawa et al fails to teach:

The light transmitting region comprises the materials recited in claim 11. Roberts et al teaches a polishing pad with an opaque 14 (processing region) and transparent 12 (light transmitting region). see abstract. Col. 4 lines 9-13 teaches the use of polyol in the pad according to Roberts et al is a polymeric material that is also a reactive thermosetting polymer. The motivation to provide polyol as a material of construction is that it is a known material of CMP polishing pads. Thus it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to use the material of Roberts et al to construct the polishing pad of Ihsikawa et al.

### ***Conclusion***

18. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 2/3/2009 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-Th during the hours of 8 a.m. and 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Sylvia R MacArthur/  
Primary Examiner, Art Unit 1792